

- (21) Application No. 39571/74 (22) Filed 11 Sep. 1974
 (31) Convention Application No. 2345896 (32) Filed 12 Sep. 1973 in
 (33) Germany (DT)
 (44) Complete Specification Published 26 May 1976
 (51) INT. CL.² E05C 3/24
 (52) Index at Acceptance E2A C6 C8G C8K C8L D5C2C



(54) IMPROVEMENTS IN OR RELATING TO MOTOR VEHICLE DOOR LATCHES

(71) We, ALBERT TACK, of 10 Holthäuser Strasse, 56 Wuppertal-Ronsdorf, Federal Republic of Germany, and FRIEDRICH GABEL of 13 Am Heynenberg, 56 Wuppertal-Ronsdorf, Federal Republic of Germany, both citizens of the Federal Republic of Germany, personally responsible partners of the firm TACK & GABEL, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to a motor vehicle door latch, comprising a first housing mountable on the inside of a door, which housing supports latch actuating levers for operating the door latch from the inside and from the outside of the vehicle, a keeper mountable on the door pillar, and a latch housing which can be mounted on an end plate of the door, the latch housing mounting a latch member, engageable with the keeper, and a driver member projecting into said first housing, the latch housing having a guideway and therein buffer supports for the keeper.

The present invention consists in a motor vehicle door latch, comprising a first housing mountable on the inside of a door, which housing supports latch actuating levers for operating the door latch from the inside and from the outside of the vehicle, a keeper mountable on the door pillar, and a latch housing which can be mounted on an end plate of the door, the latch housing mounting a latch member, engageable with the keeper, and a driver member projecting into said first housing, the latch housing having a guideway and therein buffer supports for the keeper, characterised in that said latch member is constituted by a rotatably mounted forked latch which is spring loaded in the direction of its release position and rotatably mounted in the latch housing, a hooked detent being provided in the latch housing which detent is spring urged to engage the latch both in its

partly latching as well as in its fully latching position behind at least one of its limbs, said detent mounting the driver member projecting into the first housing for releasing the detent from the latch by the actuating lever, and in that the keeper, has substantially a U-shaped portion, for engaging behind the forked latch, and in that the latch housing comprises a support member which on both sides of the guideway has buffers extending along the entire length of the guideway and ejecting means for the keeper.

In order that the invention may be more readily understood, reference is made to the accompanying drawings which illustrate diagrammatically and by way of example several embodiments thereof, and in which:-

Figure 1 is an end view of the motor vehicle door latch with a first housing and latch housings mounted on the door and a keeper secured on the door pillar;

Figure 2 is an interior view of the latch housing, in which the keeper shown in section is introduced into the guideway;

Figure 3 is a view of a forked latch and hooked detent, the releasing, part-latching and fully-latching positions being shown;

Figure 4 is an internal view into the latch housing with the forked latch in the fully-fastening position;

Figure 5 is a vertical section through the latch-housing, in section on the line V-V of Figure 4;

Figure 6 is a horizontal section on the line VI-VI of Figure 4;

Figure 7 is a further sectional view on the line VII-VII of Figure 4; Figures 3 to 7 being shown greatly enlarged;

Figure 8 is a plan view of a latch housing in which only the hooked detent and the forked latch are shown; one limb of the forked latch having two recesses;

Figure 9 is a view corresponding to Figure 8 in which the hooked detent has two recesses;

Figure 10 shows a further embodiment in

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which the hooked detent has two recesses which, however, engage the other limb compared with Figures 8 and 9;

Figure 11 is a complete internal view of a latch housing of a further embodiment in which the hooked detent and an additional support member form one component unit;

Figure 12 is a corresponding side view thereof;

Figure 13 is a sectional view on the line XIII-XIII of Figure 11;

Figure 14 is a front view of a one-piece keeper with a section through the lateral webs;

Figure 15 is a plan view thereof;

Figure 16 shows such a one-piece keeper in the guideway of a latch housing;

Figure 17 is a front view of a keeper comprising of two angle pieces;

Figure 18 is a side view thereof;

Figure 19 is a corresponding plan view of such a keeper;

Figure 20 is a front view of a keeper produced as a plate and having bushes in which through passages are provided.

Figure 21 is a plan view thereof, one side of the bush being shown in section;

Figure 22 shows a further type of construction with a wedge-shaped keeper;

Figure 23 is a front view of a support member shown by itself, an ejector buffer and an elastic member being inserted, and

Figure 24 is an internal view of a latch housing in which an additional ejector level is provided.

In the embodiment of the motor vehicle door latch shown in the drawings, A is a housing, B is a latch housing and C a keeper. Figure 1 shows the disposition of the components of the door latch, the housing A being mounted on an end plate 10 of a motor vehicle door, for example on the inside thereof. The latch housing B projects into a gap 11 between the end plate 10 of the door and a vehicle door pillar 12. The keeper C is mounted on the door pillar 12. By means of a keeper yoke 13, the keeper C is engageable into a guideway 14 (Figs. 2, 4, 11, 16, 23 and 24) of the latch housing B. Both the lock housing A and the latch housing B are connected to the end plate 10 of the door by means of fixing screws 53 (only one shown in Figure 13). The keeper C is secured to the door pillar 12 by means of screws 15 (Figure 1). Figure 1 also shows that the lock housing A contains actuating levers 16 and 17, one of which can be operated from the outside of the vehicle while another can be operated from inside the vehicle. The latch housing B is connectable to the lock housing A via a driver pin 31, more particularly referred to hereinbelow. The driver pin 31 projects into the range of movement of the actuating levers 16 and 17 of the lock housing A.

Figures 4 to 7 and 8 to 11 as well as Figures 16 and 24 show a latch housing body 19 in the

base 20 of which there are secured bushes 21 and 22. These bushes are furthermore fixed in a lid 23 which covers the housing body 19. The bush 21 constitutes a bearing axle for a forked latch 24 which is mounted rotatably thereon and is urged by a spring 25 (Figures 4 to 5) in the direction of its releasing position, that is anti-clockwise as viewed in Figure 4. The bush 22 constitutes a bearing axle for a hooked detent 26 which is urged by a spring 27 (Figures 4, 5 and 7) in the direction of engagement with the latch 24. Fixing screws (not shown) for attachment of the latch housing B to the end plate 10 may traverse the bushes 21 and 22. A further bush 28 (Figures 4 and 7) for carrying a further fixing screw is disposed at another location in the latch housing body 19.

The bushes 21 and 22 are so disposed one above the other in the housing body 19 that the detent 26 rests on the forked latch 24. In the embodiment shown in Figures 3, 4, 11, 16 and 24, the limbs 24a and 24b of the latch 24 respectively have a recess 29 and 30 capable of engaging with the hook part 26a of the catch 26.

Figure 3 shows different relative positions of the latch 24 and detent 26. The hook part 26a of the detent 26 is, in the releasing position (illustrated by broken lines) of the forked latch 24, supported on top of the limb 24a. When the forked latch 24, by insertion of the keeper C into the guideway 14, is pivoted about its bearing axle clockwise (as viewed in Figure 3), then there is initially partly latching position indicated by dash-dotted lines, in which the hook part 26a engages the recess 29 of the limb 24a and secures the latch 24. When the latch 24 is further pivoted, then finally the hook part 26a engages into the recess 30 of the limb 24b of the latch 24, indicated by solid lines, so holding the latch 24 in the fully latching position.

As shown particularly in Figures 3 to 5, 8 to 10, 11, 12, 16 and Figure 24, the forked latch 24 and the hooked detent 26 are disposed one above the other. The hooked detent 26 is provided adjacent its hook part 26a, with the driver pin 31 (Figures 3 to 5, 7, 8 to 10 and Figure 24), which is riveted to the detent 26. The driver pin 31 passes through the housing lid 23 and, as Figure 1 shows, projects into the range of movement of the actuating levers 16 and 17 of the lock housing A.

As Figures 4 to 7 show, the driver pin 31 is supported in an additional support member 32 disposed axially in front of the hooked detent 26. The support member 32 is rotatably mounted on the bush 22 and connected to the detent 26 by means of the driver pin 31.

The additional support member 32 is advantageously provided with a drive web 33 projecting into the lock housing A and on which also or additionally the actuating levers of the lock housing A can engage.

The retention of the forked latch 24 by the spring-loaded detent 26 can alternatively be so effected that, for example on the limb 24b of the forked latch 24, two recesses 29, 30 are disposed one behind the other, as illustrated in Figure 8. According to Figure 9, an arresting engagement may be effected by disposing one behind the other on the detent 26 two hook parts 26a which can either according to Figure 9 co-operate only with one limb 24b or, according to Figure 10, can co-operate only with the other fork limb 24a. In all these embodiments, a latching holding is possible both in the partially latching as well as in the fully-latching position of the latch 24.

A further embodiment showing how the detent 26 may be coupled to an additional support member 132 is shown in Figures 11 to 13. In this embodiment, a substantially Z-shaped cranked component is associated with the detent 26. The support member 132 is mounted on the bearing axle, i.e. the bush 22, of the detent 26 and has a bearing arm 132a as well as a connecting arm 132b which rests on the detent 26 and which is connected thereto, for example by spot welding. This support member 132 is in turn provided with drive webs 33 which project from the latch housing B into the lock housing A, into the range of movement of the lock actuating levers 15 and 17 therein. The actuating levers may engage one or all of these driver webs.

Figures 14 to 16 show the keeper C in which a rectangular plate 34 and the keeper yoke 13 are produced in one piece. Provided in the rectangular plate 34 are holes 36 for the passage of fixing screws. The middle web 35 of the keeper yoke extends together with the lateral webs 37 in the shape of a U frame and projects with respect to the plate 34, tongues 38 being provided which project with respect to the lateral webs 37. As shown, the keeper C is in the longitudinal direction of the keeper yoke constructed in mirror symmetrical fashion also in a direction at right-angles thereto.

Figure 16 shows how the forked latch 24 co-operates with such a keeper yoke. In this case, in the latching position, one lateral web 37 is disposed between the limbs 24a and 24b. The middle web 35 of the keeper yoke engages the back of the limb 24b, while the overlapping tongue 38 the back of the prong 24a. It can be also seen thereby that the keeper yoke has a rectangular cross-section, it alternatively has a square, cross-section.

Figures 17 to 19 show another embodiment of keeper C which is constituted by two identically formed angle pieces. The arms 39 of these angle pieces constitute the support plate in which in turn fixing holes 36 are provided to receive fixing screws. The arms 40 form the keeper yoke 13 whereby here also a rectangular cross-section is achieved. Also with this keeper yoke in which the angle pieces may be sheet metal parts produced by pressing, stamping and

shaping, and which are connected to one another by being laid side by side with the arms 40 adjacent, overlap tongues 38 which again project beyond the lateral webs 37 are also provided so that here, too, the same overlap effect is achieved with the forked latch. As the drawings also show, each arm 40 of the middle web 35 of the keeper yoke of both angle pieces is provided with an outwards curvature, so that the middle web is made resiliently yielding in the transverse direction, in other words abutment portions 41 for the latch limbs are formed.

Further embodiments of the keeper C are shown in Figures 20 to 22. In these embodiments, the keeper comprises a base plate 42, from which project spaced apart bushes 43 in which passages are provided, which carry a plate 44. Also in such an embodiment, the substantially U-frame shaped construction of the keeper is ensured. Particularly the plate 44 can, as Figure 20 shows, be tapered at both ends. The plate can, however, be of wedge-shape over its entire length, as illustrated by the plate 144 shown in Figure 22. Here, also the keeper is of mirror symmetrical construction in its longitudinal direction and likewise has the advantages of the overlap gripping of the forked latch, provided by overlap parts 44a.

In Figure 23, there is shown a buffer-support member 45 which is disposed inside the guideway 14 of the latch housing B. This support member 45 is made from an elastic material, for example synthetic plastics material and in the present embodiment is constructed as a channel-shaped inset component. In this embodiment, the buffer sides 46 extend over the entire length of the guideway 14. Furthermore, this inset component is provided with at least one holder 47 which is capable of being secured in the latch housing B by engagement around or behind, for example the bush 28 in the housing B (Figure 4). It is possible also to provide fastening means at other places in the housing.

The channel-like inset component has in the region of at least one buffer flank 46 a spring tongue 48 which projects into the channel 49 and offers an additional support for the keeper. This spring tongue 48 can be supported by an additional elastic member 50 which is housed in a pocket 51 outside the spring tongue. Furthermore, there is within the channel 49 an ejector buffer 52 which can likewise be held by friction and/or positively therein by its tapered shape.

According to Figure 24 there is provided on the bearing axle, bush 21, of the forked latch 24 an additional ejector lever 54, one arm 54a of which engages rearwardly into the guideway 41, while the other arm 54b, as a thrust arm, engages either directly into the guideway or loads the spring tongue 48 from below. Such an ejector lever is stressed upon insertion of the keeper in that the latter presses against the arm 54a and at the same time presses the thrust arm

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54b into the guideway 14. When the door is opened, this pre-stressed ejector lever operates in such a manner that the keeper is ejected forwards and out of the guideway aperture.

5 The mode of operation of the motor vehicle door lock can be briefly understood as follows:- If it is desired to close an open door of a motor vehicle, then the door is moved in the direction of the door pillar. When one of the lateral webs 37 of the keeper C comes thereby in contact with the limb 24a, then the forked latch 24 pivots into a partly latching position, dash-dotted view in Figure 3, so that the hook part 26a of the hooked detent 26 engages behind the prong 24a. Upon further movement of the keeper into the guideway 14, the forked latch 24 assumes a position such as is shown in solid lines in Figure 3. In this position of complete closure, the hook part 26a engages the recess 30 in the limb 24b. In this position of complete door closure, the forked latch 24 is supported by means of its bearing axle, bush 21, and also by means of the hook part 26a of the detent 26, so that it has a two-fold support in the latch housing B.

In the fully inserted position, the keeper C is supported cushion-wise from two opposite sides by the buffer flanks 46 and bears additionally on the bottom of the channel 49, so that it is virtually cushioned all round. One lateral web is furthermore pre-stressed as it rests on the ejector buffer 52 or on the ejector arm 54a of the ejector lever 54. Furthermore, the spring tongue 48 or the thrust arm 54b acts on the keeper so that it is housed in rattle-free manner.

Releasing, that is opening of the door, is effected through one of the levers 16 or 17 of the lock housing A in that these are so actuated that the detent 26 is lifted out of engagement with the forked latch 24 by the driver pin 31 or 33. By reason of the spring loading on the forked latch 24 and the relaxing of the ejector buffer 52 or due to the release of the pre-stressing of the ejector lever 54, the keeper is forced out of the guideway 14.

WHAT WE CLAIM IS:-

1. A motor vehicle door latch, comprising a first housing mountable on the inside of a door, which housing supports latch actuating levers for operating the door latch from the inside and from the outside of the vehicle, a keeper mountable on the door pillar, and a latch housing which can be mounted on an end plate of the door, the latch housing mounting a latch member, engageable with the keeper, and a driver member projecting into said first housing, the latch housing having a guideway and therein buffer supports for the keeper, characterised in that said latch member is constituted by a rotatably mounted forked latch which is spring loaded in the direction of its release position and rotatably mounted in the latch housing, a hooked detent being provided in the latch housing which detent is spring urged to engage the latch both in its

partly latching as well as in its fully latching position behind at least one of its limbs, said detent mounting the driver member projecting into the first housing for releasing the detent from the latch by the actuating levers, and in that the keeper, has substantially a U-shaped portion, for engaging behind the forked latch, and in that the latch housing comprises a support member which, on both sides of the guideway has buffers extending along the entire length of the guideway and ejecting means for the keeper.

2. A door latch as claimed in Claim 1, wherein the forked latch and the hooked detent are each mounted on a respective bearing axle and fixed at least in a base of the latch housing and so spaced apart one above the other, that the detent is provided above limbs of the latch, the hook part of the detent projecting into the path of pivoting movement of the limbs.

3. A door latch as claimed in Claim 2, wherein the forked latch and the hooked detent are disposed one above the other in the same plane, and are supported on the base of the latch housing.

4. A door latch as claimed in Claim 2, wherein the bearing axles both of the forked latch and also of the hooked detent are constituted by bushes held rigidly on the base of the latch housing and apertured to allow passage of retaining screws for attaching the latch housing on the end plate of the door.

5. A door latch as claimed in Claim 4, wherein the hooked detent is loaded in latch engaging direction and the forked latch is loaded in its release direction, respectively by a helical buffer spring wound around the bushes and supported at one end by the latch housing and at the other end by the forked latch or the hooked detent.

6. A door latch as claimed in Claim 1, wherein the forked latch has on one limb a recess for engagement of the hooked detent in the partly latching position and on the other limb a further recess for engagement of the hooked detent in the fully latching position.

7. A door latch as claimed in Claim 1, wherein the forked latch is provided on one of its limbs with two recesses disposed one behind the other in the pivoting movement direction of the forked latch, the hooked detent being capable of engaging the first recess in the partly latching and the second recess in the fully latching positions.

8. A door latch as claimed in Claim 1, wherein disposed one behind the other on the hook part of the detent are two recesses of which one serves to hold a limb of the forked catch in the partly latching position while the other serves to hold the same for the other limb in the fully latching position.

9. A door latch as claimed in Claim 1, wherein the hooked detent comprises a single layer plate-shaped element on which outside of its bearing point, and forming a lever arm, the

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is the driver member projecting into the first housing, as far as the actuating levers therein.

10. A door latch as claimed in Claim 9, wherein the driver member is formed by a pin projecting from the hooked detent.

11. A door latch as claimed in Claim 9, wherein the driver member is formed by a web formed from the hooked detent itself by shaping thereof.

12. A door latch as claimed in any one of Claims 9 to 11, wherein the driver member is supported by an additional support member disposed axially behind the hooked detent.

13. A door latch as claimed in claim 12, wherein the additional support member is mounted on a bearing axle for the hooked detent and coupled therewith for movement.

14. A door latch as claimed in Claim 13, wherein said support member is a substantially Z-shaped element one arm of which is connected to the hooked detent while the other is mounted on the bearing axle of the hooked detent.

15. A door latch as claimed in any one of Claims 12 to 14, wherein the additional support member is coupled for movement with the hooked detent and is provided with at least one drive web projecting into the first housing as far as the actuating levers therein.

16. A door detent as claimed in Claim 15, wherein the drive web is constructed as a transversely projecting web formed in one piece from the additional support member.

17. A door latch as claimed in Claim 1, wherein the keeper is formed from a rectangular base plate and a substantially U-shaped keeper yoke projecting with respect thereto and having over its entire length a rectangular cross-section.

18. A door latch as claimed in Claim 17, wherein said yoke has at least on the end of one side an overlap tongue projecting with respect to a lateral web.

19. A door latch as claimed in Claim 17 or 18, wherein the keeper is of symmetrical construction both in the longitudinal direction of the yoke and also in a plane at right-angles thereto.

20. A door latch as claimed in any one of Claims 17 to 19, wherein the rectangular plate and the yoke constitute a one-piece component.

21. A door latch as claimed in Claims 1 to 17, wherein the keeper comprises two right-angle pieces one arm of each of which constituting the U-shaped portion of the yoke being adjacent and connected to each other, the other two arms forming a or the base plate.

22. A door latch as claimed in Claim 21, wherein each angle piece is stamped and shaped from a flat sheet metal blank, also a web portion which forms the middle web of the yoke being extended beyond two lateral webs as overlap tongues.

23. A door latch as claimed in Claim 21 or

22, wherein the middle web of the yoke at least over parts of its length is widened at both ends to form retaining lugs.

24. A door latch as claimed in Claim 23, wherein the middle web of each angle piece is outwardly curved over parts of its length.

25. A door latch as claimed in Claims 1 and 17, wherein the keeper yoke comprises two bushes forming the lateral webs and having passages to receive fixing screws and a keeper plate forming the middle web, the bushes being secured, to the keeper plate and also to a or the base plate.

26. A door latch as claimed in Claim 23, wherein at least the keeper plate, viewed in the longitudinal direction of the keeper has a symmetrical outline tapering at both ends.

27. A door latch as claimed in Claim 25, wherein at least the keeper plate, viewed in the longitudinal direction of the keeper, is of symmetrical form tapering in a wedge-shape at only one end.

28. A door latch as claimed in Claim 1, wherein the support member is formed from an elastic material and is formed at least from two buffer strips secured individually, one on either side of said guideway.

29. A door latch as claimed in Claim 28, wherein said support member is formed by a channel-shaped inset component, one buffer strip of which, outside the guideway is constructed as a holder for anchoring the support member in the latch housing.

30. A door latch as claimed in Claim 29, wherein one buffer strip is constructed over a part of its length as a spring tongue loaded by an additional elastic member.

31. A door latch as claimed in Claim 30, wherein the inset component has outside the spring tongue a pocket to accommodate the elastic member which is housed therein under pre-stressing.

32. A door latch as claimed in Claim 29, wherein mounted within the inset component, within its channel on or near one end thereof, there is an elastic ejector buffer for the keeper.

33. A door latch as claimed in Claim 32, wherein the ejector buffer is constructed as a peripherally tapered component which is held positively and/or by friction within a correspondingly tapered portion of the channel.

34. A door latch as claimed in Claim 1, wherein rotatably pivotable in the latch housing is an ejector lever having a retaining arm and an ejector arm both projecting into the guideway.

35. A door latch as claimed in Claim 34, wherein the ejector lever is mounted on a bearing axle of the forked latch and has a buffer part on its retaining and also on its ejector arms.

36. A door latch as claimed in Claim 34, wherein the retaining arm engages the guideway from below while the ejector arm engages the guideway from the rear.

37. A door latch as claimed in claim 34, wherein the retaining arm engages beneath a tongue of an inset component to serve as a thrust member.
- 5 38. A Motor vehicle door latch, substantially as herein described with reference to and as shown in the accompanying drawings.

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Printed for Her Majesty's Stationery Office, by Croydon Printing Company Limited, Croydon, Surrey, 1976. .
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from
which copies may be obtained.

Fig. 3

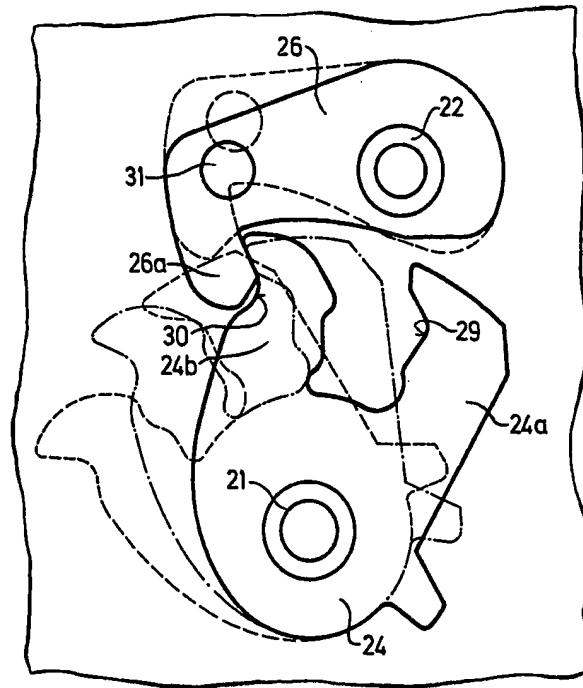


Fig. 4

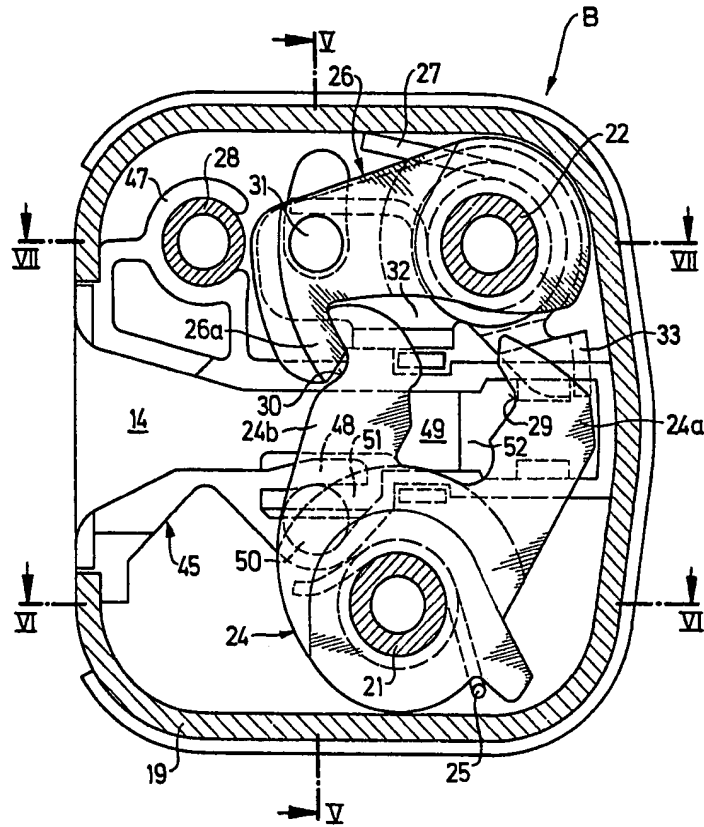


Fig. 5

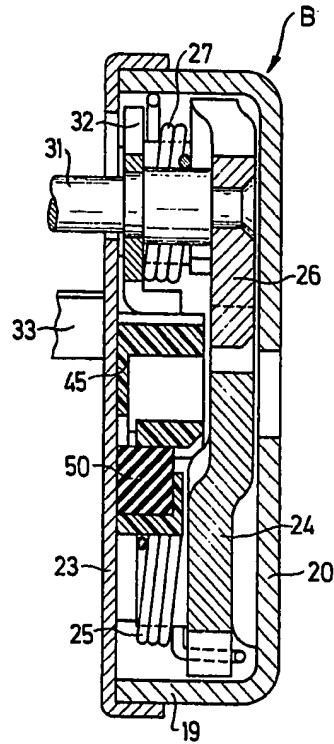


Fig. 6

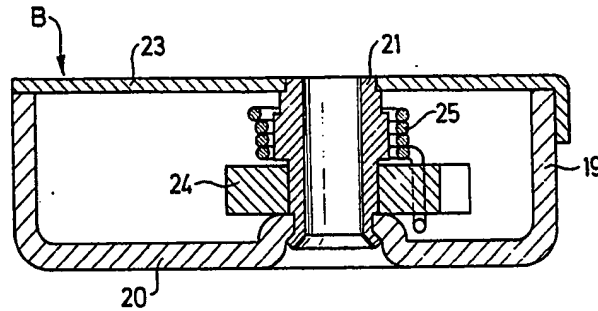


Fig. 7

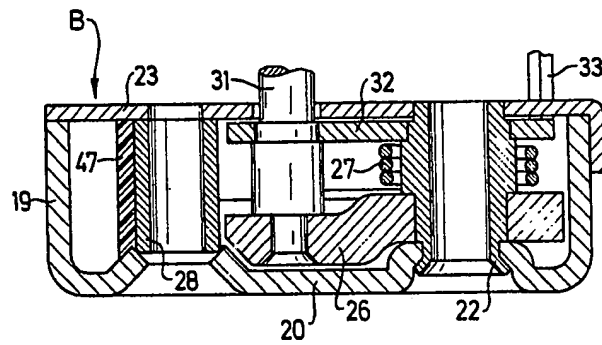


Fig. 8

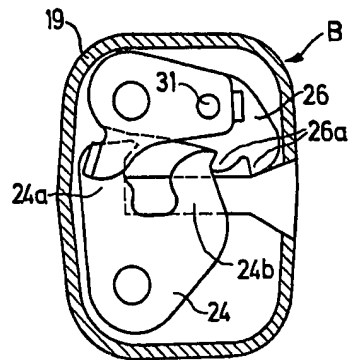
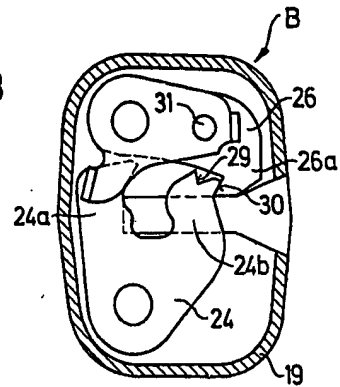


Fig. 9

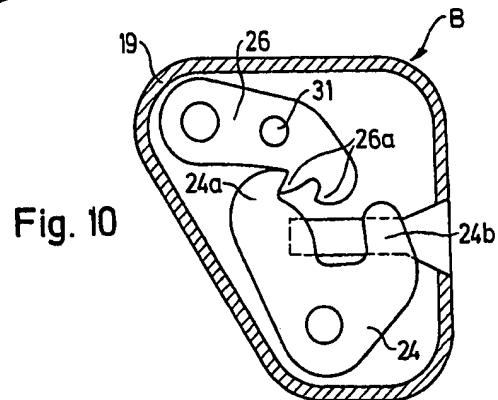


Fig. 10

Fig. 11

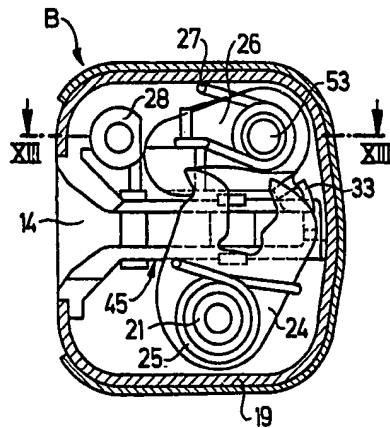


Fig. 12

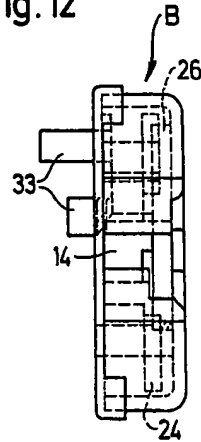


Fig. 13

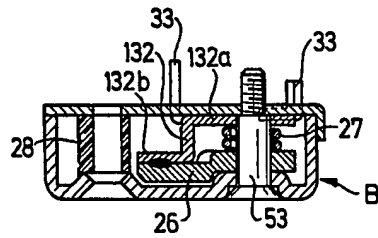


Fig. 14

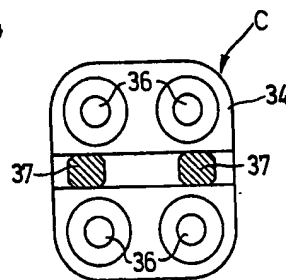


Fig. 15

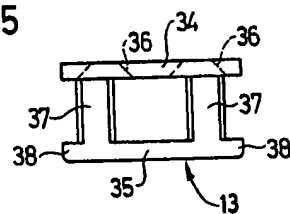


Fig. 16

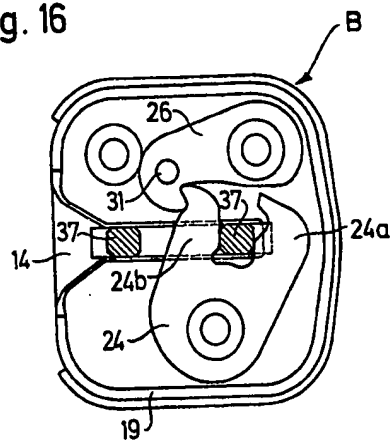


Fig. 17

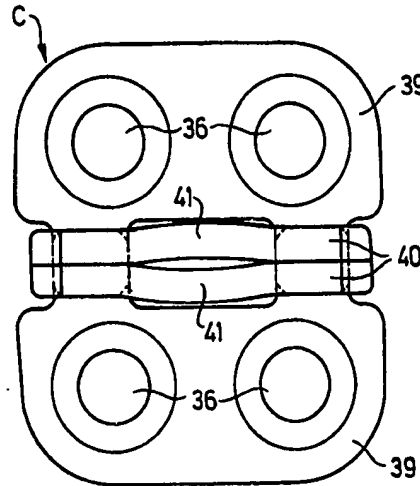


Fig. 18

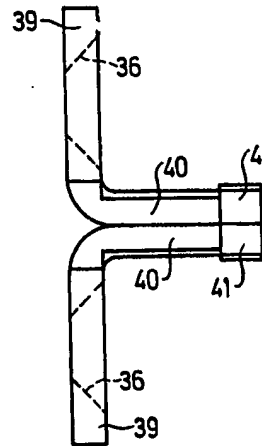


Fig. 19

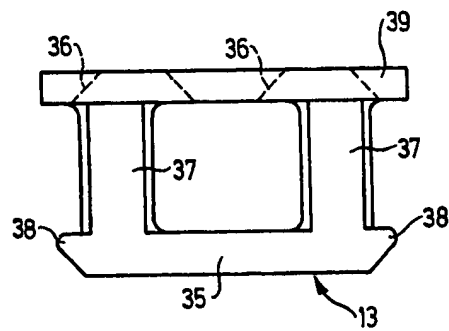


Fig. 20

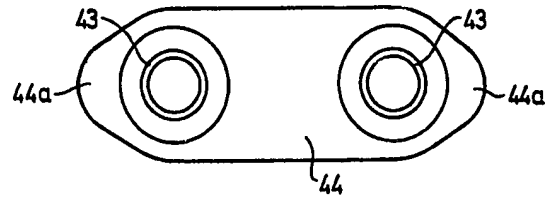


Fig. 21

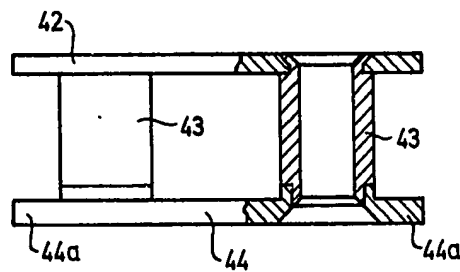


Fig. 22

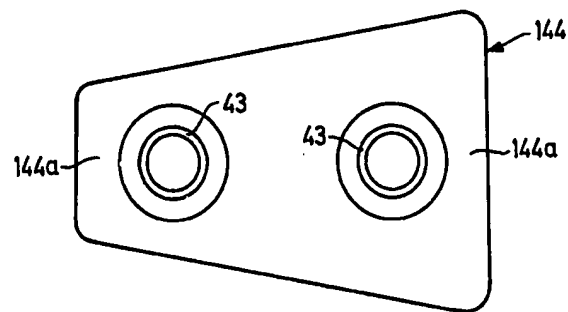


Fig. 23

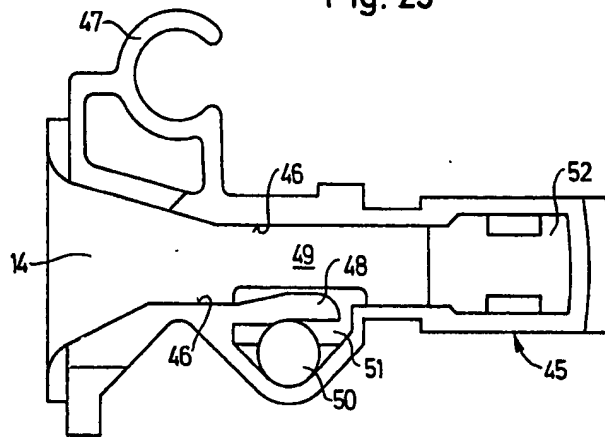


Fig. 24

